MOTOROLA
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TU313 SERIES 30-50 MC
TU312 SERIES 118-174 MC

PRECISION SELECTOR CAVITY RESONATORS

1. INTRODUCTION

MOTOROLA Precision Selector Cavity Resonators are high Q resonant filters equipped with suitable coupling loops for use with a 50 ohm coaxial line. The cavity which is painted an automotive gray enamel finish consists of a large diameter outer cylinder of copper with an adjustable concentric center conductor for tuning. Input and output loops which terminate with UHF connectors are inserted in the high current end of the cavity. Refer to Dimensional Detail 69B842527.

Five models of the Precision Selector Cavity Resonator are available. These are as follows:

MODEL TU313L - 30-34.8 MC
MODEL TU313M - 34.8-40 MC
MODEL TU313H - 40-50 MC
MODEL TU312L - 118-132 MC
MODEL TU312H - 132-174 MC

2. APPLICATION

The cavity may be used in the antenna circuit of a base station receiver to minimize interference, desensitizing, or inter-modulation resulting from high signal input levels from unwanted stations or in the transmitter antenna circuit to minimize spurious harmonic radiations or transmitter intermodulation. It can be supplied with different sets of loops to provide a varying degree of selectivity. Loops which provide a higher degree of selectivity result in a higher insertion loss.

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Issue - A

NOTE

This means the receiver sensitivity or transmitter output or both (depending upon application) will be degraded by the amount of cavity filter insertion loss for the loops used.

The insertion loss and selectivity vary slightly with frequency. Refer to the Selectivity Curves following the text of these instructions.

With the proper cables, the cavity will permit satisfactory operation of two or more transmitters into the same antenna. It is also possible to operate a transmitter and a receiver on the same antenna simultaneously for duplex communications, provided the frequency separation is adequate.

Consult Systems Engineering Department for complete details on Multiplex and duplex applications.

3. LOOPS AND INSERTION LOSS

Two kits of 0.5 db. and 2.0 db. cavity coupling loops are available (on separate order) for use with the TU313L and TU313M cavities.

Motorola Kit No.	Insertion Loss	Frequency Range In Megacycles	Color Coding	
			Top of Connector	Side of Connector
TK335	0.5 db.	30-40	1 BLACK dot	2 YELLOW dots
TK334	2.0 db.	30-40	1 RED dot	2 BROWN dots

Two kits of 0.5 db. and 2.0 db. cavity coupling loops are available (on separate order) for use with the TU313H cavity.

Motorola Kit No.	Insertion Loss	Frequency Range In Megacycles	Color Coding	
			Top of Connector	Side of Connector
TK335	0.5 db.	40-50	1 BLACK dot	2 YELLOW dots
TK336	2.0 db.	40-50	1 RED dot	2 YELLOW dots

Four kits of 0.5 db., 1.0 db., 1.5 db. and 3.0 db cavity coupling loops are available (on separate order) for use with the TU312L cavity.

Motorola Kit No.	Insertion Loss	Frequency Range In Megacycles	Color Coding	
			Top of Connector	Side of Connector
TK326	0.5 db.	118-132	1 BLACK dot	2 ORANGE dots
TK327	1.0 db.	118-132	1 BROWN dot	2 ORANGE dots
TK328	1.5 db.	118-132	1 BLUE dot	2 ORANGE dots
TK329	3.0 db.	118-132	1 ORANGE dot	2 ORANGE dots

Four kits of 0.5 db., 1.0 db., 1.5 db. and 3.0 db. cavity coupling loops are available (on separate order) for use with the TU312H cavity.

Motorola Kit No.	Insertion Loss	Frequency Range In Megacycles	Color Coding	
			Top of Connector	Side of Connector
TK330	0.5 db.	132-174	1 BLACK dot	None
TK331	1.0 db.	132-174	1 BROWN dot	None
TK332	1.5 db.	132-174	1 BLUE dot	None
TK333	3.0 db.	132-174	1 ORANGE dot	None

4. INSTALLATION

The cavity can be mounted in any position on any flat surface near to the radio equipment, allowing easy access for turning.

a. Items Necessary For Installation

(1) Center punch

(2) Hammer

(3) Drill (Size to be determined by type of bracket mounting hardware to be used)

(4) Bracket mounting hardware

(5) Screwdriver

b. Installation Procedure

(1) Study Installation Detail 69D842521 noting the additional hardware used to install the larger TU313 Series cavities. This hardware is not necessary to install the smaller TU312 Series cavities and therefore is not supplied with the unit.

(2) Select a convenient location for the cavity as near to the radio equipment as possible.

(3) Center punch mounting holes in the mounting surface using the bracket (s) as (a) template (s).

(4) Determine the type of mounting screws or hardware to be used to secure the bracket (s) to the mounting surface. These screws depend upon the type of mounting surface and are not supplied for this reason. Drill the mounting holes accordingly.

(5) Secure the mounting bracket (s) to the mounting surface.

(6) Fasten the cavity to the mounting bracket (s) using the hold-down strap (s) and hardware supplied.

5. INTERCABLING AND ADJUSTMENT

a. Intercabling Cavity With Equipment

(1) Remove the coaxial antenna lead-in cable from the equipment.

NOTE
The input and output circuits of the cavity are not marked, as they are identical.

(2) Connect the antenna lead-in cable to one end of the cavity.

(3) Prepare a new cable of sufficient length with applicable connectors at each end to interconnect the cavity with the antenna changeover relay. Proceed as shown on Cable Preparation Detail 69B842526.

(4) Connect the new cable between the other end of the cavity and the antenna changeover relay.

b. Cavity Tuning Procedure

(1) Adjust top tuning lock nut until top of threaded invar rod is flush with top of lock nut. (Low frequency end of range).

(2) Plug test meter into receiver meter jack and set meter switch in position 2 (1st limiter).

(3) Contact a station that you desire to receive that does not saturate 1st limiter of receiver and arrange for a test signal.

NOTE
The cavity tuning is very sharp due to its high Q. Great care must be excerised to obtain optimum tuning.

(4) Slowly turn upper tuning nut in a clockwise direction keeping lower nut clear and watch for maximum indication on the limiter meter.

(5) After maximum indication has been reached turn up lower nut and lock securely.

IMPORTANT
Nuts must be locked tight by hand or temperature compensation will not function.

(6) Tune antenna circuit on receiver for maximum 1st limiter reading (position 2).

NOTE
If limiter (pos. 2) is saturated, switch to position 1.

(7) Check cavity tuning by slowly applying downward and then upward pressure on the locking assembly. If tuning is correct the 1st limiter reading will decrease immediately indicating resonance at that setting. An increase in 1st limiter reading indicates the cavity is not tuned to resonance.

(8) Check equipment for proper operation by contacting mobile field cars or desired stations.

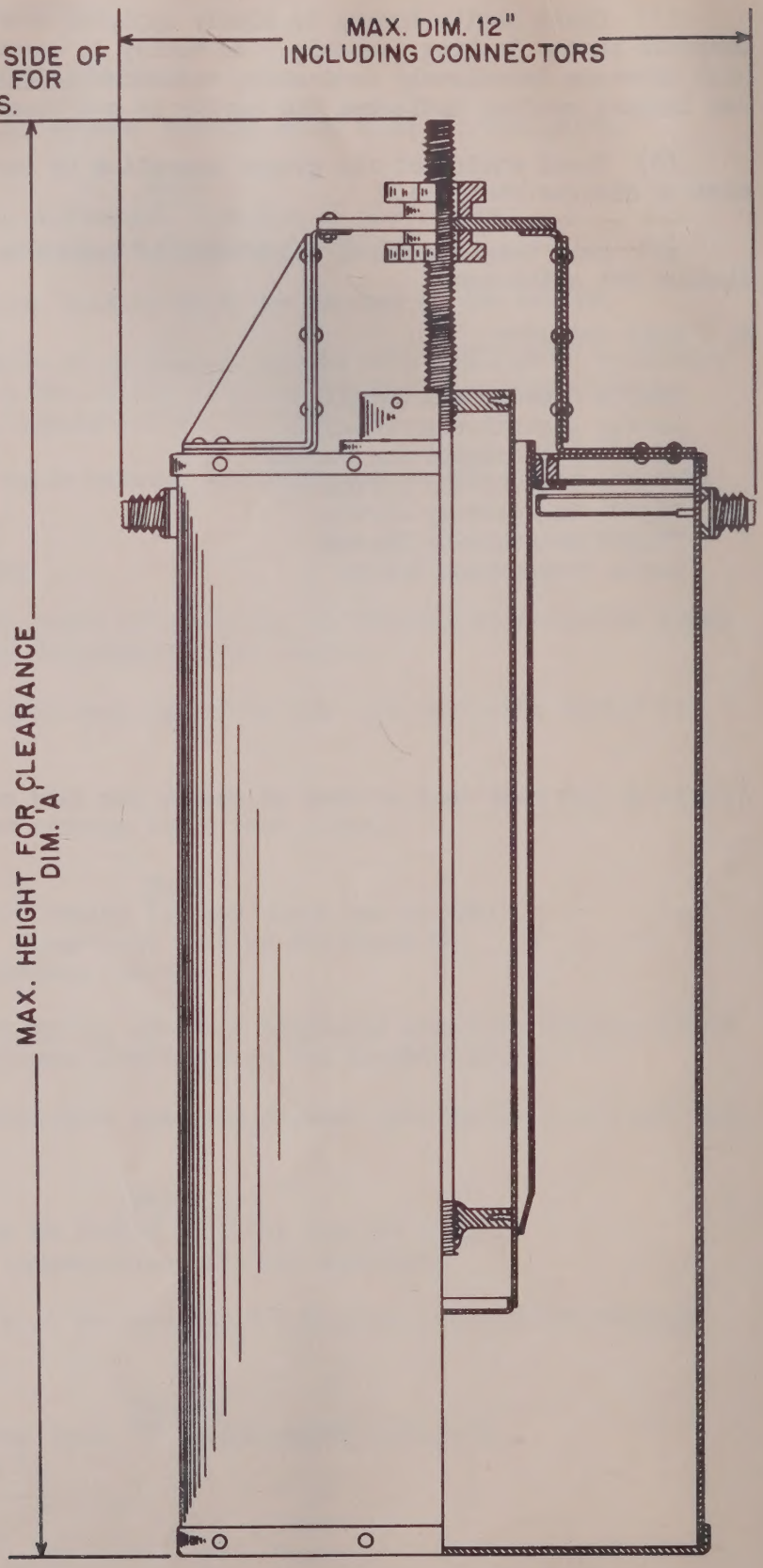
(9) Make touch-up final adjustment of cavity on a weak station. (1st limiter not saturated.)

6. DATA INCLUDED

Cavity Dimensional Detail	69B842527
Cavity Installation Detail	69D842521
TU313L & M Selectivity Curves	69B842523
TU313H Selectivity Curves	69B842522
TU312L Selectivity Curves	69B842525
TU312H Selectivity Curves	69B842524
Cable Preparation Detail	69B842526

PRECISION SELECTOR CAVITY RESONATOR
DIMENSIONAL DETAIL

NOTE:
ALLOW 6" ON EACH SIDE OF CAVITY RESONATOR FOR ROUTING OF CABLES.



MODEL	DIM. 'A' IN INCHES
TU312H	32
TU312L	32
TU313L	78
TU313M	78
TU313H	78

DETAIL NO. 69B842527

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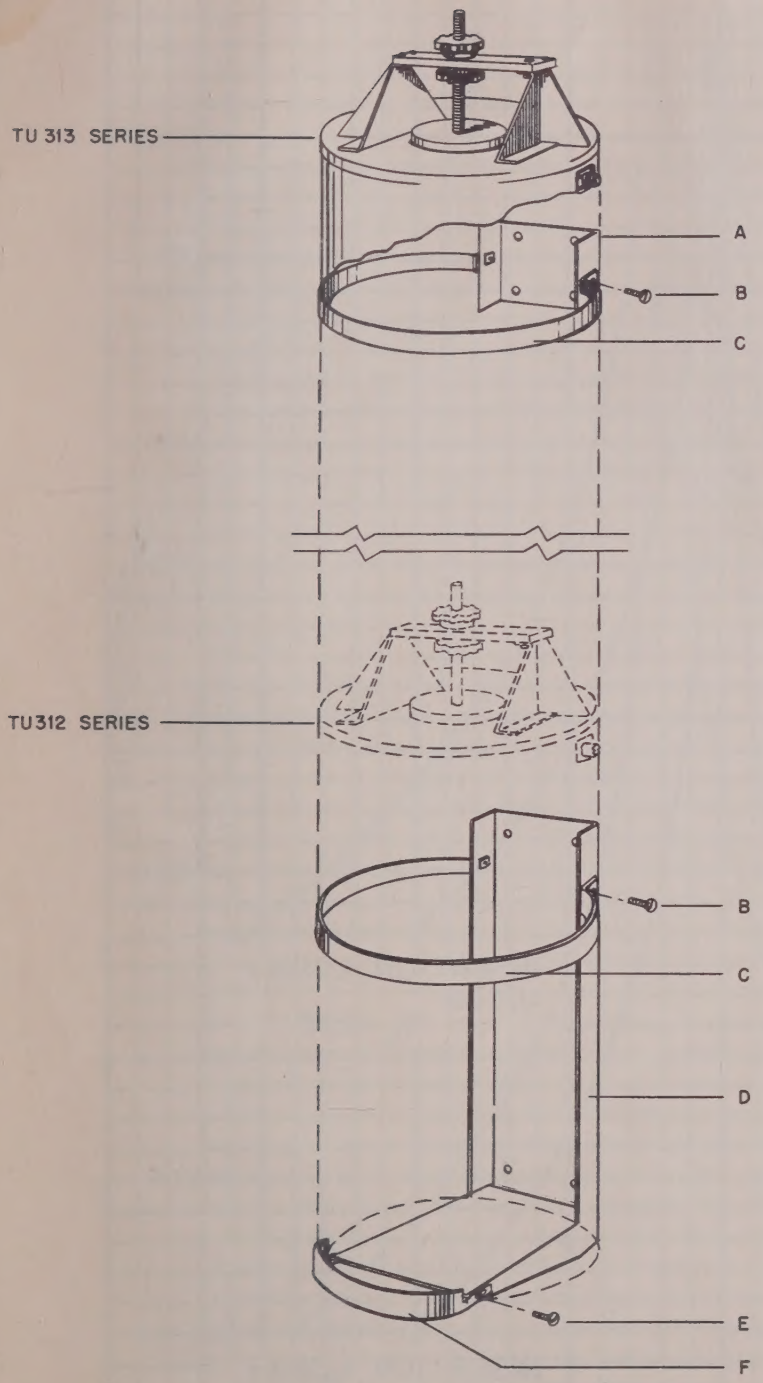
PRECISION SELECTOR CAVITY RESONATOR INSTALLATION DETAIL



MOUNTING HARDWARE TABLES

MODEL TU312 SERIES

ITEM	QTY.	PART NO.	DESCRIPTION
B	2	3S1209	SCREW, MACHINE (10-32 X 1/2")
C	1	42C480516	STRAP, HOLD-DOWN
D	1	7D480514	BRACKET, MOUNTING (LARGE)
E	2	3S9661	SCREW, MACHINE (8-32 X 3/8")
F	1	42B480518	CLAMP, MOUNTING

MODEL TU313 SERIES

ITEM	QTY.	PART NO.	DESCRIPTION
A	1	7B483587	BRACKET, MOUNTING (SMALL)
B	4	3S1209	SCREW, MACHINE (10-32 X 1/2")
C	2	42C480516	STRAP HOLD-DOWN
D	1	7D480514	BRACKET, MOUNTING (LARGE)
E	2	3S9661	SCREW, MACHINE (8-32 X 3/8")
F	1	42B480518	CLAMP, MOUNTING

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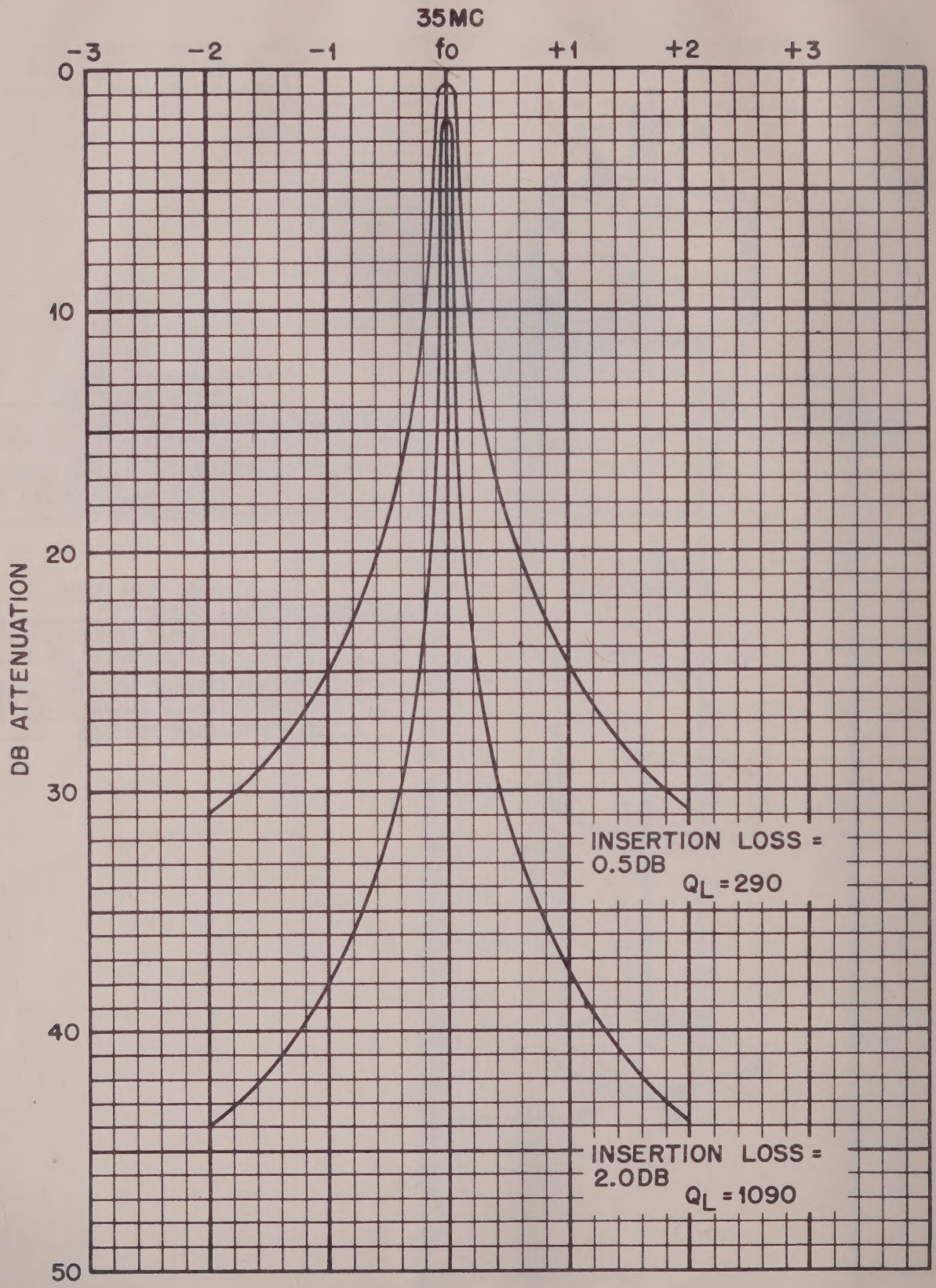
MODELS TU313L & M CAVITY RESONATORS
SELECTIVITY CURVES



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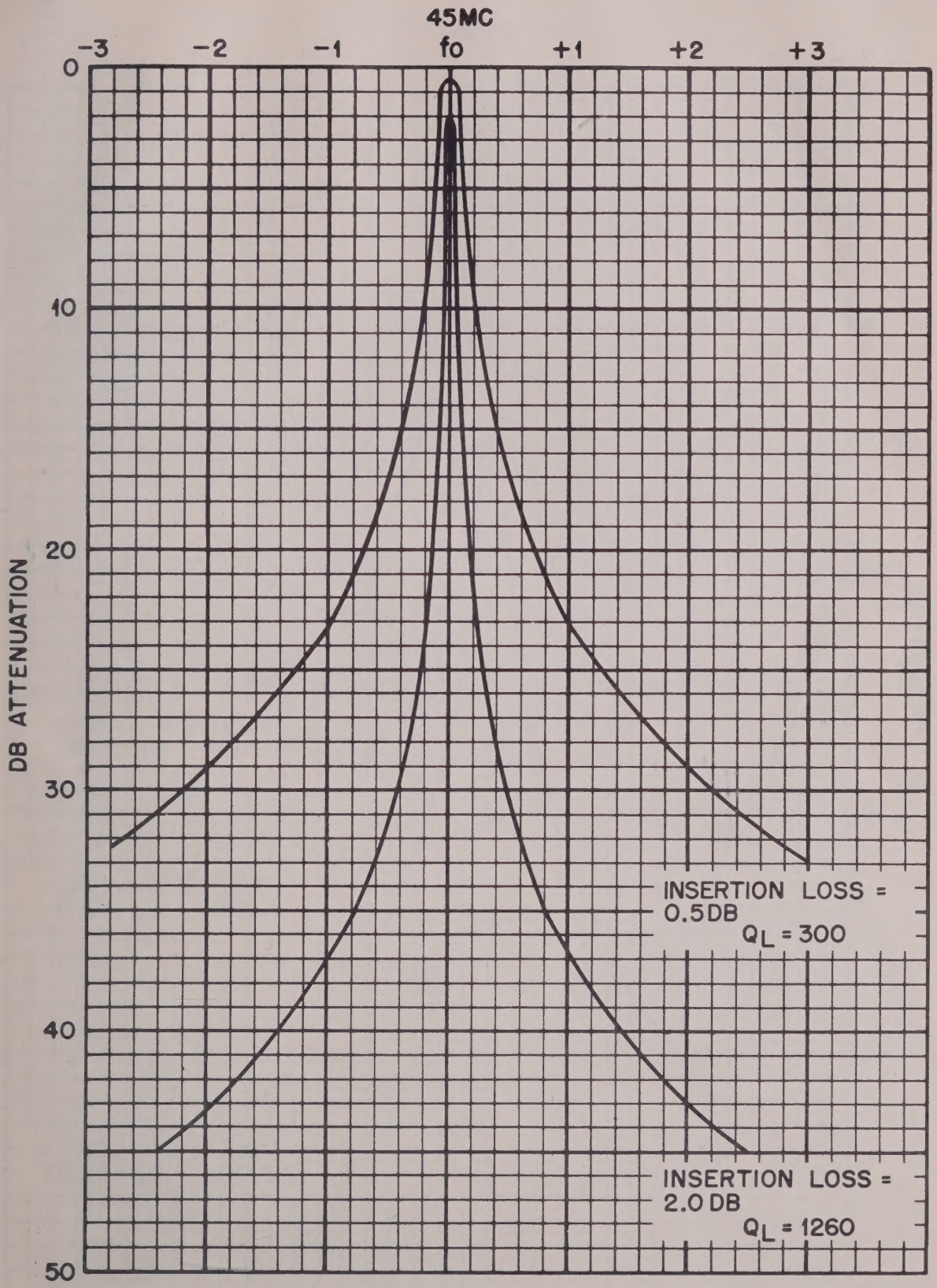
MODEL TU313H CAVITY RESONATOR
SELECTIVITY CURVES



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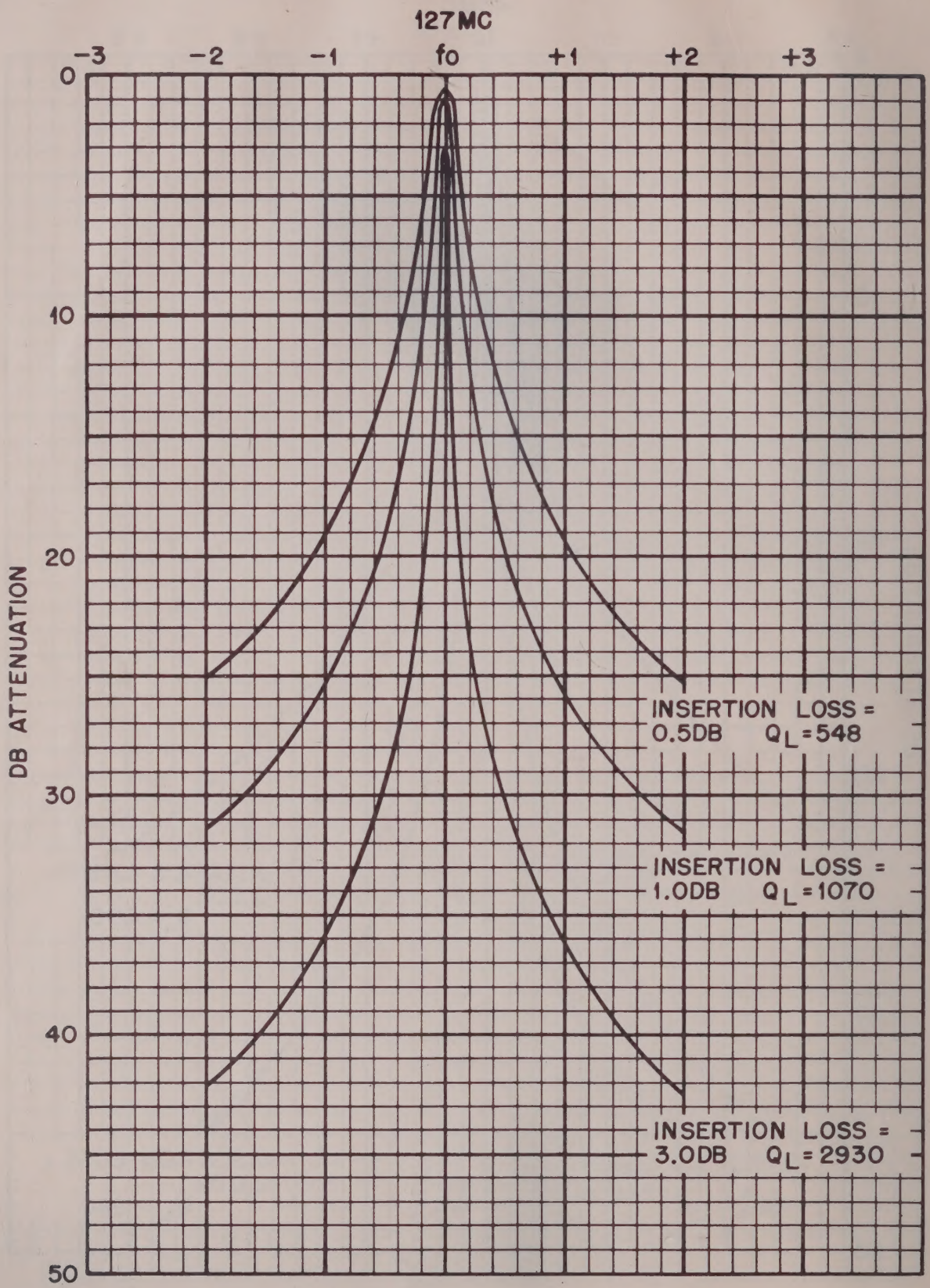
MODEL TU312L CAVITY RESONATOR
SELECTIVITY CURVES



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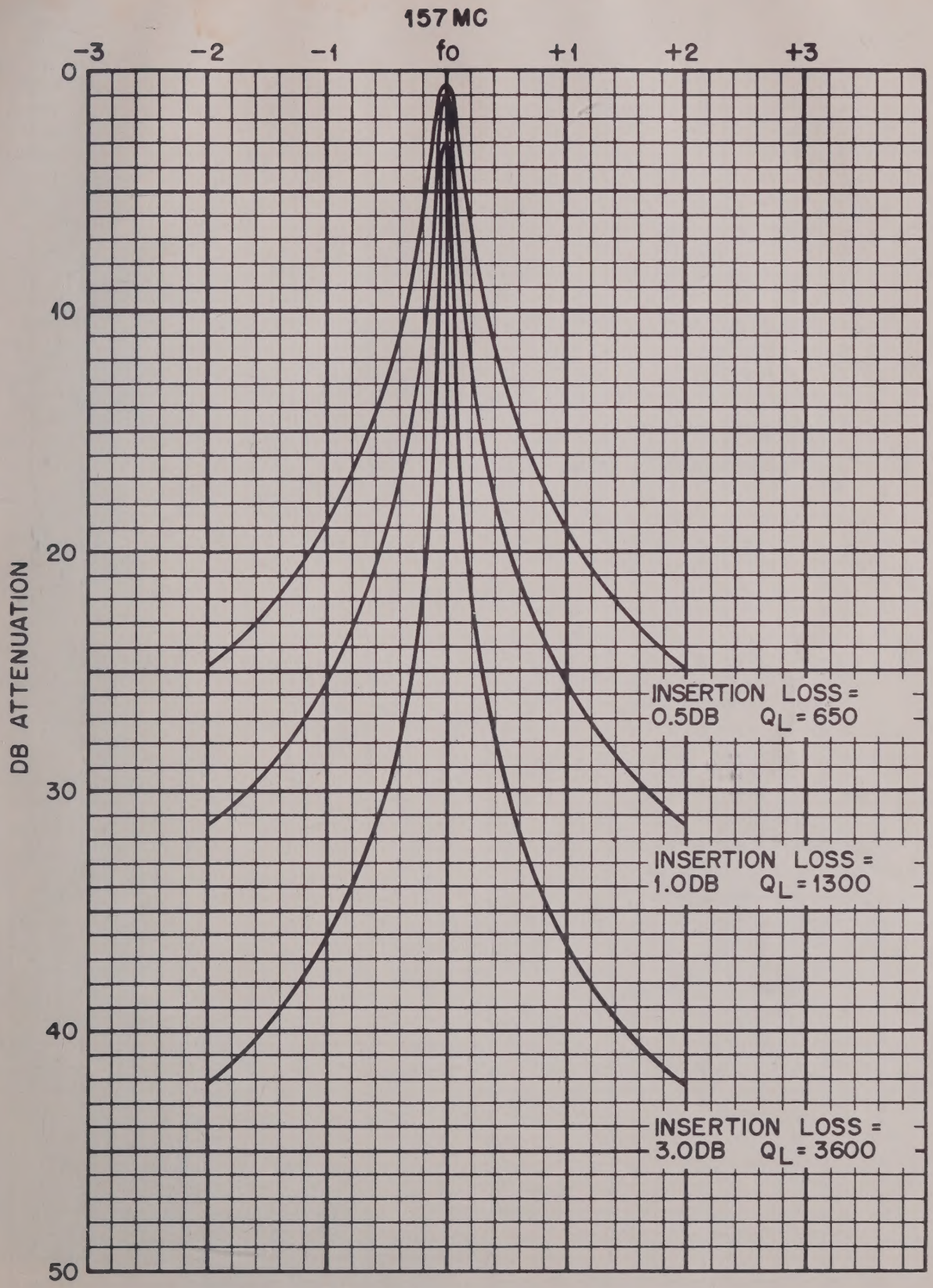

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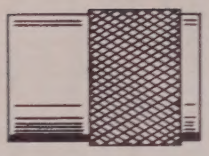
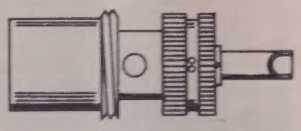
PRECISION SELECTOR CAVITY RESONATOR
CABLE PREPARATION DETAIL

CABLE	UHF CONNECTOR
RG-8/U	83-1SP, PL-259 MOTOROLA PART NO. 28A42310

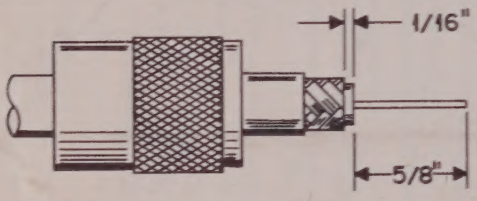


COUPLING RING

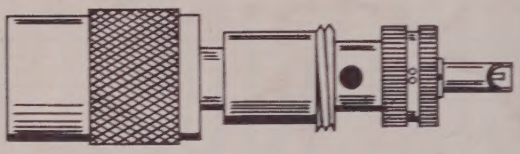


PLUG SUB-ASSEMBLY

CUT END OF CABLE AND REMOVE 1 1/8" OF VINYL JACKET.



TRIM END OF CABLE SO THAT 5/8" OF CENTER CONDUCTOR IS BARE AND 1/16" OF DIELECTRIC REMAINS. TIN EXPOSED CONDUCTOR AND BRAID. SLIDE BACK SHELL AND COUPLING RING ON CABLE.



SCREW THE PLUG SUB-ASSEMBLY ON TO THE CABLE. SOLDER PLUG SUB-ASSEMBLY TO BRAID THROUGH SOLDER HOLES. SOLDER CENTER CONDUCTOR TO CONTACT. *CAUTION - DO NOT USE EXCESSIVE HEAT OR SOLDER.* USE VERY HOT IRON, SOLDER QUICKLY AND IMMEDIATELY CHILL WITH COLD, WET CLOTH.

SLIDE COUPLING RING OVER PLUG SUB-ASSEMBLY, POSITION BACK SHELL SUCH THAT SUFFICIENT CLEARANCE REMAINS TO PERMIT FREE ROTATION OF COUPLING NUT; TIGHTEN SET SCREW.

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